COMPUTEREYES™

by

DIGITAL VISION

Video Acquisition System
for
Personal Computers

OWNERS' MANUAL

COMPUTEREYES

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SECTION 1

INTRODUCTION

Congratulations on your purchase of the COMPUTEREYES video acquisition system. We are confident that you will find it to be one of the most valuable and useful peripherals ever developed for the Atari series of personal computers. The ability to inexpensively acquire real-world images from any standard video source opens the door for many new applications for your computer.

This manual contains all the information you should need in order to make full use of the COMPUTEREYES system. The manual covers the installation and operation of the COMPUTEREYES hardware and software, including the COMPUTEREYES Camera System. We suggest that you read the INSTALLATION and GETTING STARTED sections thoroughly before you go too far in order to avoid any possible confusion.

COMPUTEREYES is warranted to be free of manufacturing defects for a period of one year from the date of purchase (ninety days for the camera itself in Camera Systems). Please fill out and return the Owner Registration Form in the rear of this manual. This way, we can keep you informed of updates and enhancements as they become available.

Digital Vision considers you, our customers, to be a valuable resource. We encourage your suggestions and comments concerning any current products or ideas for future ones. Feedback of any type from our customers helps us maintain our high standards of quality and value. Please refer any correspondence to the address on the back cover of this manual.

Thank you for selecting this Digital Vision product. We trust that it will provide you with many years of outstanding service.

SECTION 2

INSTALLATION

The installation of COMPUTEREYES is a simple, straightforward procedure that takes only a few moments to perform. Installation consists of two parts: Connecting COMPUTEREYES to the Atari, and connecting your video source to COMPUTEREYES. The two parts are described separately below.

CONNECTION TO THE ATARI

The COMPUTEREYES module is provided with two nine-pin "D" connectors, similar to the ones found on Game Controllers. These connectors plug into the Atari's Controller Ports on your computer. To perform the connection to the Atari, just follow these easy steps:

1. TURN OFF THE POWER to the Atari.

2. Locate the Atari's Controller Ports. They are "D"-shaped sockets with two rows of contact pins (containing four and five pins respectively).

3. If there are devices currently plugged into the Controller Ports, unplug them. Unplug by gripping the connector at the sides and applying a slight side-to-side rocking motion while pulling gently.

4. Plug the COMPUTEREYES module into Controller Ports 1 and 2 by inserting the connectors into the Controller Ports and applying a slight side-to-side rocking motion while pushing gently. The connectors are labelled "1" and "2", and MUST be plugged into the corresponding Controller Ports for proper operation. Make sure that the connectors are seated firmly.

CONNECTION TO THE VIDEO SOURCE

After COMPUTEREYES has been connected to your Atari's Controller Ports, all that remains is to connect it to your video source. This is done via the standard RCA-type Phono Jack mounted on the rear of the COMPUTEREYES module. Since COMPUTEREYES is capable of acquiring images from a wide variety of sources, the following paragraphs are guidelines for making this connection.

COMPUTEREYES Camera System

If you have purchased the COMPUTEREYES Camera System, then you have been supplied with a coaxial cable assembly. On one end of this cable is a BNC-type connector (the larger connector). This end connects to the camera by aligning the two tabs on the camera's connector at its rear with the two slots on the cable's connector, inserting the connector, and twisting clockwise to engage the locking mechanism. The other end of the cable is fitted with a Phono Plug. Connect this to the COMPUTEREYES Module by inserting with a slight twisting motion. Connect the power cord of the camera to any standard AC outlet.

Video Tape Recorders / Video Disk Players

These types of equipment are universally fitted with Video Output connectors of some type. By far, the most common connector is a Phono Jack labelled "Video Out". What you need is a coaxial cable between your recorder/player's Video Output connector and the COMPUTEREYES input connector. In most cases, this is just a Phono-Plug-to-Phono-Plug cable, the same type used to make most stereo system connections. If your equipment was not provided with such a cable, or if you don't have one in your collection, they are readily available at any stereo or radio supply store. Insert at both ends with a slight twisting motion.

Video Cameras for Video Tape Recorders

Video cameras that were purchased to operate with Video Tape Recorders usually have special cables that connect them to the recorder, since they often have power, audio, and remote control signals along with the video signal. The easiest way to interface to this type of camera is to connect it to the recorder as usual, and connect the recorder to COMPUTEREYES as discussed in the paragraph above. Alternatively, an adaptor for your particular camera can be

purchased where you bought the camera if the recorder must not be present. This adaptor supplies power to the camera and makes the audio and video signals available on connectors. These are usually Phono Jacks, so that you can cable from the adaptor to COMPUTEREYES with a Phono-Plug-to-Phono-Plug cable, as in the paragraph above.

Other Video Cameras

Other types of video cameras, such as surveillance cameras, can be used as long as they put out standard video signals (that is, the same as Video Tape Players, Videodisks, etc.), or standard industrial (non-interlaced) video. Many cameras have BNC-type output connectors, the type used in the COMPUTEREYES Camera System. For these cameras, a 10-foot cable can be ordered from Digital Vision directly for $30.00 plus $2.00 shipping and handling. Other lengths (up to 100 feet) can be special-ordered for an additional $.50 per foot. For other cameras, special cables may have to be assembled or purchased if the output connector is not standard. Ask about it where you bought your camera.

SECTION 3

GETTING STARTED

The purpose of this section is to acquaint you with the operation of COMPUTEREYES and to verify that the system is performing properly. If you have not already installed your COMPUTEREYES system by this point, refer to the INSTALLATION section and do it now.

The System Software disk included with COMPUTEREYES is a standard single-density disk with no form of copy protection. This is to allow you to easily make back-up copies of the software for your own use, and to more readily build your own software around that provided, if you are so inclined. BACK UP THE SYSTEM SOFTWARE DISK NOW! Any one of the many available disk back-up utilities will work. We highly recommend copying the System Software disk and then storing it in a safe place, while using the copy (call it the "working copy") when working with COMPUTEREYES.

Before proceeding, make sure that the COMPUTEREYES module is connected to the Atari's Controller Ports correctly, that you have cabled your video source to COMPUTEREYES, and that your System Software disk is backed up. Now insert the working copy of your System Software disk in the disk drive and turn on the monitor, disk drive, and Atari. The disk will spin for a few seconds and present you with a menu of actions from which you can select. This is the Main Menu of the COMPUTEREYES Executive program (called "XEC").

XEC is a friendly user-oriented program written in BASIC that lets you access all of the capabilities of COMPUTEREYES. It is able to acquire high-contrast and grey-scale images, view the last-acquired image, save images to and retrieve them from disk, catalog the disk, etc. It has on-line Help available so that you don't have to keep referencing this manual. XEC is discussed in greater detail in its own section. Right now, you want to see that first image, so this discussion will proceed with that goal in mind.

There are two knobs on the COMPUTEREYES module, labelled "Sync" and "Brightness". Rotate both knobs to approximately the center of their travel. First, you must synchronize the system to your video source (there is indeed

a difference among "standard" video signal sources). To do this, select ADJUST SYNC from the XEC Main Menu by typing "A" (a carriage return is not required here). The menu is replaced by a line at the bottom of the screen that indicates which way to turn the "Sync" knob. (The screen will be flashing somewhat at this point—this is normal.) Adjust the knob in the indicated direction (left means counter-clockwise) until the words "IN SYNC" appear at the bottom. Experiment with this to get the feel. It is a very simple process and is the same as adjusting the horizontal and vertical sync controls on a TV set (it has undoubtedly taken you longer to read this than to perform the adjustment). Once the Sync control has been set for a given video source, it shouldn't have to be adjusted again, although it pays to check it periodically. If you are having trouble getting the system to synchronize, the problem is probably quite simple, but you should turn now to the IN CASE OF DIFFICULTY section before proceeding.

Once the system is in sync, you can press any key to return to the Main Menu. The next step is to adjust the brightness setting by first selecting the BRIGHTNESS command (type "B") and then adjusting the Brightness knob. The XEC begins performing continuous image scans, about one every six seconds, to allow you to set an appropriate brightness level. To adjust the brightness, turn the knob clockwise to make the image brighter or counter-clockwise to make it darker. Don't be alarmed if the image appears distorted during these continuous scans; this is caused by an Atari quirk and will not show up in the final image. Once you are satisfied with the brightness level, press any key to return to the Main Menu.

At this point, you are ready to acquire your first image. Do it now by typing "N" to select NORMAL CAPTURE from the menu. Then, for the next six seconds or so, the Atari's screen will go blank while the image is being captured, and the image will suddenly appear when the scan is completed. Once the image has formed, you can view it for as long as you like. Then, to return to the Main Menu, press any key. Try performing more NORMAL CAPTUREs, fine-tuning the brightness to get the most pleasing result.

If you are having difficulty obtaining an image, you can refer to the IN CASE OF DIFFICULTY section to determine the cause. The problem is again probably quite simple, so a few likely causes are listed here:

1. Image quite out of focus (if using a camera).

2. Image not stationary—don't forget, the subject must be relatively stationary during the six-second scan.

Helpful Hint: The video source you are using provides a video signal that is the same type as that put out by the Atari itself on its five-pin audio/video DIN connector to your monitor (assuming you are using a monitor and not a television receiver through the Atari's RF output). This means that you can plug your video source directly into the monitor and view the image there! Try it. This often reveals the cause of faulty images.

Now you are ready to try some of the more complex image capture modes. For all of these, you must adjust the brightness control so that ONLY the brightest portion of the image appears white on the screen during the brightness scans—just a little bit of white is best. We recommend that you read the following section on the COMPUTEREYES Executive before proceeding further.

Many of the images that you will acquire, especially Graphics 8 Mode images with pseudo-grey tones, will appear to take on false colorations if you are using a color monitor or TV set. These "artifacts" are not actually present in the image, as you would see if you were to print the image, but we recommend that you turn the "Color" control on your monitor or TV all the way down when using COMPUTEREYES to minimize their effects.

SECTION 4

THE COMPUTEREYES EXECUTIVE

The COMPUTEREYES Executive (XEC) is a friendly menu-driven program that allows you to acquire images, view them, and save them to disk. It is all you really need in order to take full advantage of the system. Thus, even if you have no programming experience whatsoever, COMPUTEREYES is ready to be used as soon as it's unpacked and installed.

It is assumed here that you have already performed the COMPUTEREYES installation; if not, you must do so before you can use XEC to any advantage. To use XEC, insert a WORKING COPY of the System Software disk in your disk drive and turn on the computer. After a few seconds, you will be presented with the XEC Main Menu, which looks like this:

COMPUTEREYES (TM) EXECUTIVE

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SELECT FROM MAIN MENU:

ADJUST SYNC	VIEW CURRENT IMAGE
BRIGHTNESS	SAVE TO DISK
NORMAL CAPTURE	RETRIEVE FROM DISK
4-LEVEL CAPTURE	CATALOG
8-LEVEL CAPTURE	?—HELP
HIGH CONT CAPTURE	EXIT
LOW CONT CAPTURE	

SELECTION: _

To make a selection from the XEC Main Menu, just type the first letter of the function you wish to select (it is displayed in inverse on the screen). A carriage return (RETURN key) is not required here. The following sections explain the operation of each of the functions available from the Main Menu.

ADJUST SYNC

Before an image can be acquired, COMPUTEREYES must be synchronized with the signal from the video source you are using. This is the same as adjusting, for example, the Vertical Sync control on a TV set if the picture begins to roll, and is necessary because of differences between "standard" video signals. After you select ADJUST SYNC, the menu is replaced by a line at the bottom of the screen that indicates which way to turn the "Sync" knob. The screen will be flashing somewhat at this point, but this is normal. Adjust the knob in the indicated direction (left means counter-clockwise) until the words "IN SYNC" appear at the bottom. Experiment with this to get the feel. Once the Sync control has been set for a given video source, it shouldn't have to be adjusted again, although it pays to check it periodically. In actuality, a Machine Language program is running, continuously monitoring the signals from COMPUTEREYES and displaying the line of text. The program also monitors the Atari keyboard, and when you press a key you are returned to the XEC Main Menu.

BRIGHTNESS

The BRIGHTNESS command allows you to adjust the brightness setting on the COMPUTEREYES module prior to performing an actual image acquisition. XEC enters a mode wherein continuous scans are performed, allowing you to perform adjustments to the COMPUTEREYES Brightness control to attain an optimal overall brightness setting. To adjust the Brightness control, rotate the knob clockwise to get a brighter image or counter-clockwise for a darker image. You can also use this mode to help you set camera aim and focus. The image that you see will have a certain amount of distortion while using the BRIGHTNESS command. This is caused by the Atari's screen display circuitry disrupting the microprocessor timing; when you capture an actual image (see below), this circuitry is disabled and the distortion disappears.

If the image you are about to acquire is the normal (high-contrast) type, adjust the brightness so that the image appears with the amount of brightness that you desire. IMPORTANT: If the image is to be one of the grey-scale types (that is, any of the other capture modes), adjust the brightness so that only the very

brightest portion of the image appears white (most of the screen black). Experimenting with brightness levels will give you the feel for determining where the control should be set.

NORMAL CAPTURE

Selecting NORMAL CAPTURE immediately causes a normal (high-contrast) image to be acquired into the Atari's High-Resolution Graphics memory in Graphics 8 Mode. During the scan, which takes about six seconds, the Atari's graphics are disabled so that its screen display hardware doesn't interfere with the microprocessor timing, causing image distortion. When the scan is complete, the image will be displayed for you to view. Press any key to return to the Main Menu. In many cases, you will want to take a few scans before you get an image to your satisfaction. Pressing a key any time while the scan is being executed aborts the scan and returns you to the Main Menu. The scan itself is performed by a Machine Language program that rapidly converts the signals coming from the COMPUTEREYES module into the image data that you see.

4-LEVEL CAPTURE

The 4-LEVEL CAPTURE function operates in a manner similar to the NORMAL CAPTURE function, except that an image containing synthesized grey levels is formed. This image is actually generated from four high-contrast images taken at different thresholds (like different exposures or f-stops with a camera). The images are merged together as they are acquired with different "masks" (or number of pixels, or dots, lit) corresponding to different grey levels. When the four scans are complete, you then see the final result (also a Graphics 8 Mode image), which you can view until you press a key, returning you to the Main Menu. Since the 4-LEVEL CAPTURE function takes about 25 seconds, it often makes sense to do a high-contrast scan first to make sure that you're getting a good image, although you can press a key at any time to abort the acquisition. Usually, the best results are obtained by setting the Brightness control such that the first scan, which shows the brightest part of the image, has a relatively small number of pixels lit.

8-LEVEL CAPTURE

The 8-LEVEL CAPTURE function operates in a manner similar to the 4-LEVEL CAPTURE function, except that an image containing eight synthesized grey levels is formed. This mode takes about 50 seconds to execute. The effect is to yield an image with smoother grey levels, at the sacrifice of acquisition time. Usually, if the goal is to print an image on a dot-matrix printer, the NORMAL,

4-LEVEL, or 8-LEVEL capture modes are the best, as opposed to the HIGH- and LOW-CONTRAST modes described next. Note that 4-LEVEL and 8-LEVEL images tend to cause false colorations ("artifacts") on color monitors and TV's; for this reason, we recommend that the "Color" control be turned all the way down when using COMPUTEREYES.

HIGH-CONTRAST CAPTURE

The HIGH-CONTRAST CAPTURE function lets you acquire an image in Graphics 7.5 Mode, which means that it is an image that consists of four real solid grey levels. This is done at the expense of horizontal resolution, but the results can be superior to the 4- or 8-LEVEL scans, depending on the application. The HIGH-CONTRAST mode images are formed from three scans at various threshold levels, which requires about 18 seconds to perform. When the three scans are complete, you then see the final result, which you can view until you press a key, returning you to the Main Menu. After you save these images to disk (see below), they can be loaded into many of the popular image processing programs, such as Atari Artist and the Koala Pad.

LOW-CONTRAST CAPTURE

The LOW-CONTRAST CAPTURE function is identical to HIGH-CONTRAST CAPTURE, except that a different set of threshold values are used, resulting in images which have a lower amount of contrast. Depending on the subject material, lighting, and other considerations, you will want to experiment with which Graphics 7.5 Mode capture function provides the best results.

VIEW CURRENT IMAGE

This function is fairly self-explanatory. It allows you to quickly view the last image that you acquired (or retrieved from disk—see below). When you select it, you are immediately presented with a display of the current image. Press any key to return to the Main Menu. If no image has been acquired or retrieved, you are likely to see an incomprehensible pattern displayed. Just press a key to get to the Main Menu.

SAVE TO DISK

The SAVE TO DISK function allows you to store images that you have acquired using COMPUTEREYES as binary files on floppy disk. These files may then be recalled for viewing at a later date (see RETRIEVE FROM DISK below) or used by other programs for further processing, printing, etc. The entire 8 kilobyte bit-mapped graphics area is stored as a binary file, occupying exactly 62 disk sectors. This is the format that most other image handling programs will accept.

When you select the SAVE TO DISK command, you are first asked on which disk drive you would like to save the image:

DRIVE (1-4) ? _

You respond with the appropriate Drive number; a RETURN is not required. Next, you are asked for the name of the file to be saved:

FILE NAME? _

If you just type RETURN (null file name), you will be returned to the Main Menu. If you want to use the name of a file already on the disk and you're not sure of its name, type "?" to get a catalog of the disk (see CATALOG below). Images are stored using the name exactly as you enter it. Finally, if the image was acquired using either the LOW- or HIGH-CONTRAST CAPTURE modes, you are asked whether you want to save the file in Graphics Tablet format:

GRAPHICS TABLET FORMAT (Y/N) ? _

You answer by typing "Y" or "N" (no RETURN). If you type "Y", the image will be saved with the header information required to make the file Graphics Tablet compatible, and will automatically be given the ".PIC" extension. XEC then proceeds to write the image on the disk. If something goes wrong, e.g. the disk is full or you attempt to save onto a write-protected disk, an appropriate error message is displayed and you are returned to the Main Menu.

RETRIEVE FROM DISK

The RETRIEVE FROM DISK function is the opposite of SAVE TO DISK. It allows you to retrieve images saved previously for you to view. It also allows you to

retrieve images generated by other programs. You are first asked to specify the Drive Number and File Name, as with the SAVE TO DISK command above. Using the "?" feature to obtain a catalog can be very useful here, if you can't remember the names of all your images. Graphics Tablet-compatible images must be specified with the ".PIC" extension. Then you are asked whether the image was captured in the LOW- or HIGH-CONTRAST mode (as opposed to NORMAL, 4-LEVEL, or 8-LEVEL):

ARE YOU LOADING A LOW- OR HIGH CONTRAST IMAGE (Y/N) ? _

This is so that the XEC knows what intensity tables to use. (Don't worry—if you're not sure, the image will look strange and you can just load it again.) You respond by typing "Y" or "N" respectively. Once the image has been retrieved, it is displayed for you to view. Typing any key returns you to the Main Menu.

CATALOG

The CATALOG function allows you to obtain a catalog (directory) listing for one of the disk drives. You are first asked to specify for which drive you'd like a catalog, as described in the SAVE TO DISK section. The catalog is displayed for you to view, and then you can type any key to return to the Main Menu. You can cause the Catalog listing to pause for you to view by pressing Control-1; pressing Control-1 a second time resumes the listing.

?—HELP

The HELP function provides you with on-line assistance for each of the functions available from the Main Menu. When you select HELP (by typing a Question Mark "?"), you are presented with another menu, from which you select the function with which you need assistance. The Help Menu looks like this:

COMPUTEREYES ON-LINE ASSISTANCE

SELECT FROM HELP MENU:

ADJUST SYNC	VIEW CURRENT IMAGE
BRIGHTNESS	SAVE TO DISK
NORMAL CAPTURE	RETRIEVE FROM DISK
4-LEVEL CAPTURE	CATALOG
8-LEVEL CAPTURE	?—HELP
HIGH CONT CAPTURE	EXIT
LOW CONT CAPTURE	

(RETURN FOR MAIN MENU)

SELECTION: _

To select a HELP item, just type the letter of the function of your choice (again, no RETURN required). You will be presented with a screen of information concerning the function. Once you have finished examining the information, press any key to return to the Help Menu. To get back to the Main Menu, type RETURN (or any other key that's not a valid HELP item). In general, the assistance available on-line is a compact outline form of the information in this manual; refer to the sections in this chapter for more detail.

EXIT

The EXIT function is simply the means by which you leave XEC and return to BASIC. If you want to re-enter XEC, you may merely type "RUN".

SECTION 5

THEORY OF OPERATION

The purpose of this section is to acquaint the user with the principles behind the operation of COMPUTEREYES. Although gate-level and line-of-code-level analyses are beyond the scope of this document, the material included here is necessarily somewhat technical. Readers not familiar with the nature of video signals will have difficulty understanding the information presented. It is important to note that it is not necessary to understand any of the information provided here in order to fully utilize the system.

GENERAL OPERATION

COMPUTEREYES is a system consisting of a carefully planned combination of hardware and software; neither has any worth without the other. The system performs a slow scan on the video signal present at the COMPUTEREYES module's input connector. During every vertical scan period, the system takes in 192 samples, or one for each of the Atari's bit-mapped graphics rows. Thus, one column of pixels are stored every vertical scan, or 16.6 milliseconds. The point in time during each horizontal scan period that the samples are taken is delayed from the horizontal sync by an amount that is very slowly increased as the COMPUTEREYES scan progresses. The result is that successive columns of pixels are acquired, beginning with a short delay from the horizontal sync (left side of image) to a long delay (right side). Since 320 columns must be acquired, a complete COMPUTEREYES scan requires 320 x 16.6 milliseconds, or a little under six seconds.

The video information is thresholded against a level determined by the Brightness control and by signals from the Atari. For a normal (high-contrast) acquisition, just one threshold level is used. For a grey-scale scan, the system automatically steps through four or eight levels and does four or eight complete scans. The data from each scan is combined with data from previous ones after each scan by software that decides whether a pixel should be lit based on what grey level (brightness) is being processed.

COMPUTEREYES HARDWARE

The COMPUTEREYES module is a stand-alone unit that connects to the Atari via the Atari's Game Controller connectors. Software running in the Atari (see below) controls the acquisition of an image in the following manner. A signal is sent to initiate a COMPUTEREYES scan. The hardware then produces a delay from each horizontal sync pulse that increases slowly during the six-second scan. At the end of the delay, the level of the video signal is sampled. The sampled video and the composite sync signals are sent back to the Atari. It is the software's task to detect the sync and place the sampled video in the appropriate pixel position in the Atari's bit-mapped graphics memory.

The Atari also sends four signals to the COMPUTEREYES module to determine the video threshold level. These signals are digital-to-analog converted, combined with the level from the Brightness control, and applied to one input of a high-speed analog comparator. The other input is the video signal. The comparator's output is sampled by the delayed horizontal sync pulse.

An analog comparator is also used to threshold the video at a lower level to provide the composite sync signal. This level is determined by the setting of the Sync control. Anti-drift circuitry is included to assure that the sync level doesn't change with varying images.

COMPUTEREYES SOFTWARE

The heart of the COMPUTEREYES software is a Machine Language program that sets the video threshold level, starts a COMPUTEREYES scan, and then gathers the data transmitted by the COMPUTEREYES module. After a scan is initiated, the program waits a predetermined number of vertical syncs so that the image is centered left-to-right and then acquires data. After each vertical sync, a predetermined number of horizontal syncs are awaited so that the image is centered top-to-bottom. Then, a very tight loop is entered wherein horizontal sync is detected and one video sample is taken in. The appropriate bit in bit-mapped graphics memory is calculated and is set or cleared depending on the value of the sample. This continues for the 192 pixels in each column. The process is repeated for each of the 320 columns.

For grey-scale scans, an outer loop is provided that sequentially sets the video threshold to the four or eight possible values and calls the routine discussed in the paragraph above. After each call, a merge routine is invoked that combines the most recent image with the composite image. This routine applies a mask to the image such that only N pixels out of eight will be lit based on the current threshold setting, where N is the threshold setting. For example, 1 out of 8 pixels will be lit for dark areas, 4 out of 8 for medium-intensity areas, etc.

For the Graphics 7.5 Mode grey-scale images, a different algorithm is used. Here, pixels are twice as wide as those of Graphics 8 Mode images, and are each represented by two bits in image memory. These two bits determine which of the four intensity levels is to be used in displaying the pixel. Therefore, the HIGH- and LOW-CONTRAST mode software maps the results of the three image scans to the set of two-bit values of the Graphics 7.5 Mode image.

The memory requirements for both Graphics 8 and Graphics 7.5 Mode images are extensive. The images and their Atari Display Lists are mapped into memory just below RAMTOP. These require approximately 20K of RAM space.

A separate program is also provided to assist in adjusting the Sync control. This is done to avoid the inconvenience of performing multiple scans with an unknown image during initial set-up. The Sync routine is also a Machine Language program that monitors the composite sync signal from the COMPUTEREYES module and continuously checks the vertical and horizontal sync widths for correctness within certain tolerances. It displays, at the bottom of the Atari's text screen, a message relating which direction the Sync control should be adjusted, or a message indicating that the system is in sync. It also monitors the Atari's keyboard and returns to its caller if a keypress is detected.

SECTION 6

IN CASE OF DIFFICULTY

If, at any point, you experience difficulty with the operation of any aspect of the COMPUTEREYES system, please refer to this section for help. In most instances, the problem can be identified to have a very simple cause, and can be easily remedied. In fact, the least frequently occurring problem is a defect in the COMPUTEREYES system itself. The trouble-shooting information is presented in an easy-to-follow outline format. To use it, first locate the type of problem you are having by major heading (Roman numerals). Then follow the steps in the subtopics to either resolve or isolate the cause of the problem. In the items below, the term "boot" refers to the process of inserting the System Software disk, turning on the Atari, and observing that the Executive Main Menu appears on the Atari's screen.

I. DISK WON'T BOOT

A. If other disks boot properly:
   1. If this disk is a copy of the original System Software disk, make another copy and try booting that.
   2. If this disk is a fresh copy, try booting the System Software disk.
   3. If this disk is the System Software disk, the disk has been destroyed. For a replacement, send the original System Software disk plus $15.00 replacement/handling fee to the address on the back cover of this manual.
   4. If even the replacement System Software disk doesn't boot, it is possible that your disk drive has gone out of alignment. See your Atari dealer.

B. If other disks also do not boot, a problem with your Atari system must be resolved. Look in the following areas:
   1. Disk interface cable connectors not seated properly
   2. Disk drive out of alignment
   3. Disk speed out of adjustment
   4. Defective disk drive

If you have two drives, swap their device assignments (with power off) to isolate the problem.

II. SYSTEM WON'T SYNC

A. COMPUTEREYES module not installed in Atari Game Controller ports properly. Check that connectors are seated firmly and that there is no damage to the connectors or cables. Make sure that the connectors labelled "1" and "2" are correctly installed in their corresponding sockets.
B. No video source at Video Input connector. Check that:
   1. Video cable is inserted firmly at both ends.
   2. Video source is powered (camera, VCR, etc. plugged in and turned on).
C. Incompatible video signal—video source does not conform with industry standards. Consult manual and/or manufacturer of source.
D. Possible COMPUTEREYES module failure—see Part VI.

III. SYSTEM SYNCS BUT NO IMAGE (ALL BLACK)

A. Turn Brightness control full clockwise and do a NORMAL scan. If screen is not all white, then possible COMPUTEREYES module failure—see Part VI.
B. If screen is white, adjust Brightness control counter-clockwise and repeat scans until image appears.
C. If no image, see Part V.

IV. SYSTEM SYNCS BUT NO IMAGE (ALL WHITE)

A. Turn Brightness control full counter-clockwise and do a NORMAL scan. If screen is not all black, then possible COMPUTEREYES module failure—see Part VI.
B. If screen is black, adjust Brightness control clockwise and repeat scans until image appears.
C. If no image, see Part V.

V. SYSTEM SYNCS, ALL WHITE & ALL BLACK ATTAINABLE, BUT POOR OR NO IMAGE

A. Image far too light or too dark.
B. Image quite out of focus (camera only).
C. Image is changing too rapidly—the image must be relatively stationary for six seconds (NORMAL), 25 or 50 seconds (4- or 8-LEVEL), or 18 seconds (HIGH- or LOW-CONTRAST).
D. If at all possible, view the image directly on a monitor, such as the one into which your Atari is plugged. Many monitors have phono jacks for input connectors, the same as on COMPUTEREYES. Plugging the video source into a monitor usually reveals the cause of the problem.
E. If image looks good on monitor, then possible COMPUTEREYES module failure—see Part VI.

VI. POSSIBLE COMPUTEREYES MODULE FAILURE

A. If none of the remedies described above provides a solution to your problem, it is possible that the COMPUTEREYES module has failed.
B. Visually examine the COMPUTEREYES module for signs of damage (broken connector pins, etc.)
C. Write Digital Vision Customer Service at the address on the back cover of this manual or call (617) 444-9040 between the hours of 9:00 and 5:00 PM Eastern Time. A representative will be available to either give you assistance with your problem, or to give you a Return Authorzation (RA) number. No goods will be accepted for warranty repair without an RA number assigned. Explain the nature of your problem and any evidence of damage you may have found.

D. If you are returning your unit for repair, pack it carefully (the original shipping container is excellent for this). Send the package prepaid and insured via UPS or US Mail to Digital Vision Customer Service at the address on the back cover of this manual. Digital Vision will repair or replace the unit and return it prepaid within five working days. For units not under warranty, or where the warranty has been voided, a flat fee of $30.00 must be paid before the unit can be returned.

SECTION 7

WARRANTY INFORMATION

Product: COMPUTEREYES Video Acquisition System

Type: Limited Warranty

Warrantee: This Digital Vision product warranty extends to the original purchaser.

Warranty coverage & performance: Digital Vision, Inc. warrants this product against defects in material or workmanship as follows:

Parts—New or comparable rebuilt parts in exchange for defective parts one year after original purchase (ninety days for video camera as part of Camera System).

Labor & Service—Carry-in service or delivery of the product prepaid & insured to an authorized Digital Vision service facility or to the factory one year after original purchase (ninety days for video camera as part of Camera System).

We suggest that you retain the dealer's dated bill of sale or Digital Vision invoice as evidence of the date of purchase.

THIS WARRANTY IS VOID IF THE PRODUCT HAS BEEN DAMAGED BY ACCIDENT OR UNREASONABLE USE, ALTERATION, NEGLECT, IMPROPER SERVICE OR OTHER CAUSES NOT ARISING OUT OF DEFECTS IN MATERIAL OR WORKMANSHIP, OR IF THE SERIAL NUMBER HAS BEEN ALTERED OR DEFACED.

Warranty Disclaimers: Digital Vision, Inc. makes no warranties, either express or implied, with respect to this manual or with respect to the product described in this manual, its performance, merchantability, or fitness for any particular purpose. In no event will Digital Vision, Inc. be liable for direct, indirect, incidental, or consequential damages resulting from any defect in the product. Digital Vision, Inc. shall not be liable for any incidental or consequential damages for breach of any express or implied warranty on this product.

OWNER REGISTRATION AND WARRANTY FORM

Please complete this form and return it to Digital Vision as soon as possible. This will allow us to keep you updated as any new information on this and other products becomes available.

NAME _____

COMPANY _____

STREET _____

CITY _____

STATE _____ **ZIP** _____

PRODUCT:

☐ **COMPUTEREYES** (Atari)

☐ **COMPUTEREYES** Camera System

SERIAL NUMBER: _____

DATE PURCHASED: _____

WHERE PURCHASED:

☐ **STORE**

Name: _____

Address: _____

_____

☐ **DIRECT FROM DIGITAL VISION**

Where did you see this product advertised?

_____

Product Application:

_____

Please remove from manual, fold in half, tape or staple at bottom, affix stamp, and mail. Thank you.

Tape or Staple Here

Fold Here

PUT STAMP HERE
THE POST OFFICE
WILL NOT DELIVER
MAIL WITHOUT
POSTAGE

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